

## ***New Phytologist* Supporting Information**

**Article title:** Divergence of duplicated genes by repeated partitioning of splice forms and subcellular localization.

**Authors:** Yichun Qiu, Yii Van Tay, Yuan Ruan, Keith L. Adams

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**The following Supporting Information is available for this article:**

**Fig. S1.** Scheme for primer design.

**Fig. S2.** The translated sequences of the last exon of alternatively spliced and specialized tAPX showing the conserved hydrophobic thylakoid-anchorage chain.

**Fig. S3.** Case studies of sub-localized duplicated *cpAPX* genes.

**Fig. S4.** The evolution of *cpAPX* genes in Solanaceae.

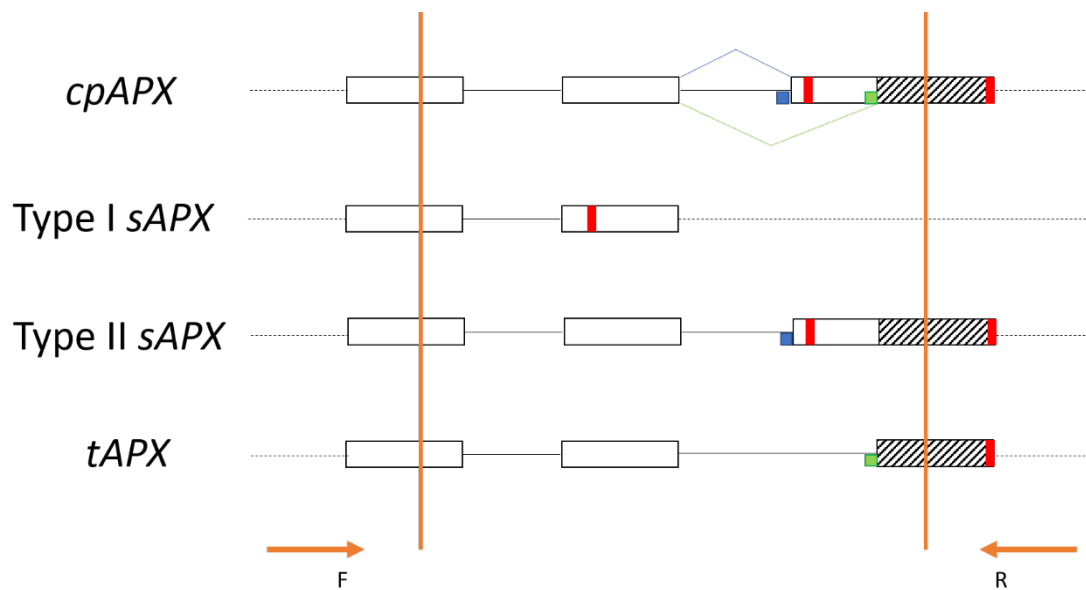
**Table S1.** CpAPX genes examined in this study (submitted separately).

**Table S2.** Plant materials in this study (submitted separately).

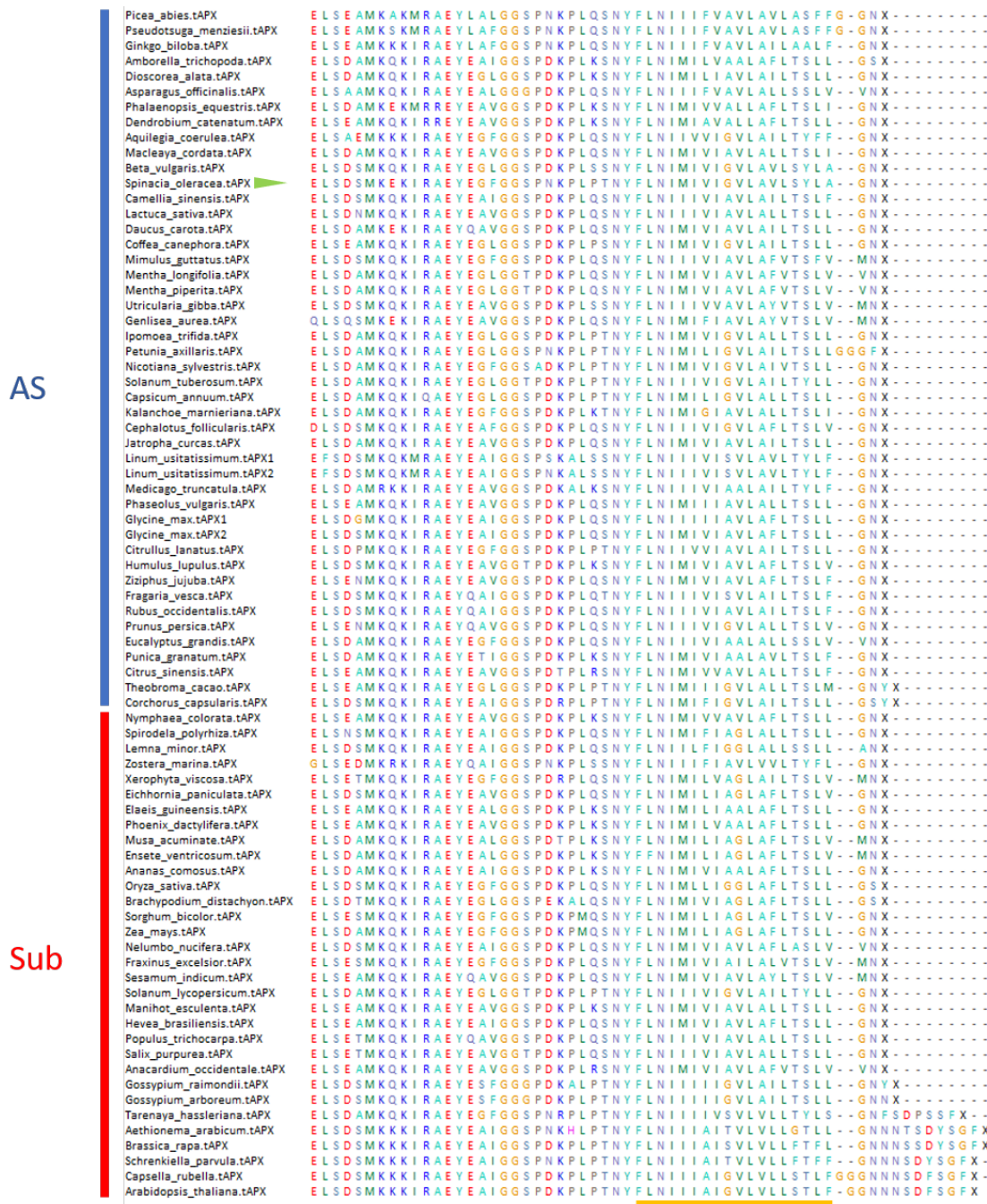
**Table S3.** Primers designed for this study (submitted separately).

**Table S4.** The selection analyses of cpAPX genes (submitted separately).

**Fig. S1.** Scheme for primer design. Alternatively-spliced single copy *cpAPX*, specialized *sAPX* (Type I and II) and specialized *tAPX* are aligned with only the last three exons shown by boxes. Blue and green squares are splicing acceptors corresponding to *sAPX* and *tAPX* transcripts, respectively. Red bars are stop codons. Striped bars represent the hydrophobic tail coding sequences. The forward (F) and reverse (R) primers (arrows) are designed outside of the orange bars to distinguish the coding potential for *tAPX* and *sAPX*.

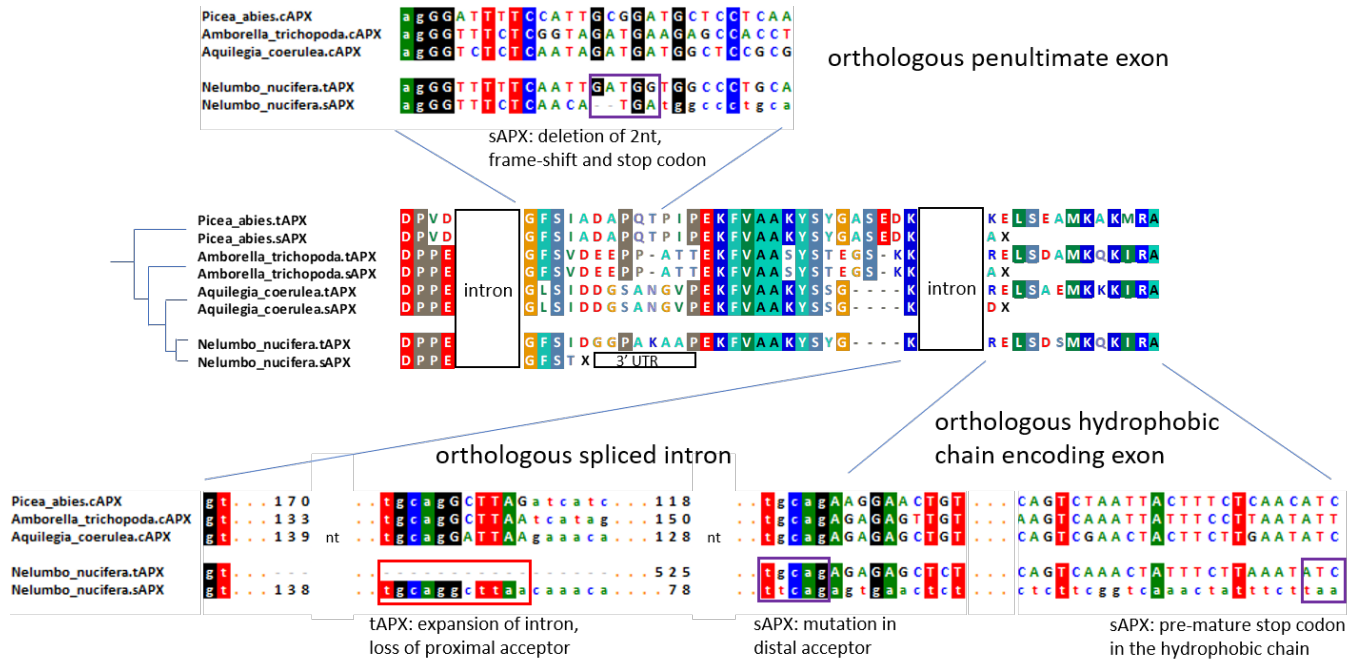


**Fig. S2.** The translated sequences of the last exon of alternatively spliced (blue) and specialized (red) tAPX showing the conserved hydrophobic thylakoid-anchorage chain. The green triangle points to the spinach tAPX which was purified from the thylakoidal membrane by Miyake and Asada (1992).



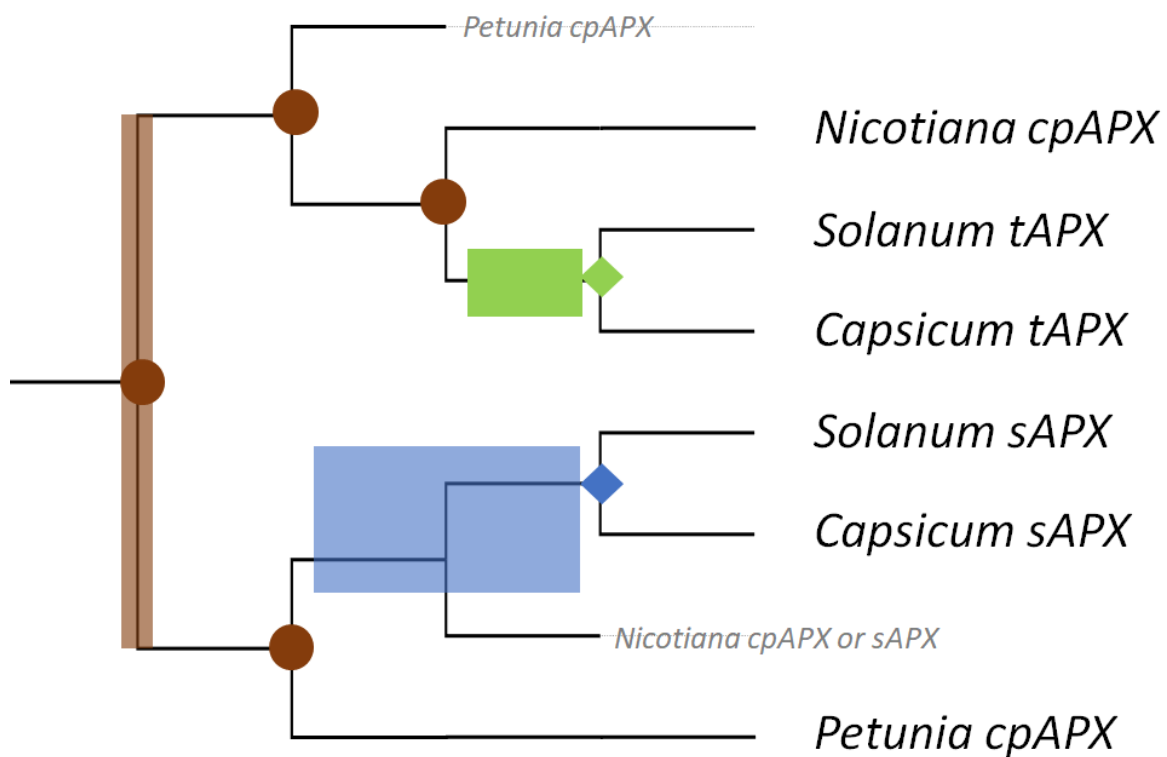
**Fig. S3.** Case studies of sub-localized duplicated *cpAPX* genes. Amino acid and nucleotide sequences of sub-localized paralogous are aligned with several single-copy orthologs. Red boxes and purple boxes indicate the nucleotide sequence changes contributing to the tAPX specialization and sAPX, respectively, and a short description is indicated beside the boxes. (a) *Nelumbo nucifera*; (b) *Zostera marina*; (c) Musaceae.

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**Fig. S4.** The evolution of *cpAPX* genes in Solanaceae. The genes in black are in the extant genomes. The genes in grey were presumably present in the ancestral genome and were lost. Brown bar indicates gene duplication. Brown circles indicate ancestral alternatively spliced genes. Green and blue boxes indicate possible timing when the inferred gene function specialization to *tAPX* and *sAPX* took place. Green and blue diamonds indicate the ancestral *tAPX* and *sAPX* gene before the divergence of *Solanum* and *Capsicum* from a common ancestor.



## References:

**Miyake C, Asada K. 1992.** Thylakoid-bound ascorbate peroxidase in spinach chloroplasts and photoreduction of its primary product monodehydroascorbate radicals in thylakoids. *Plant Cell Physiology* **33**(5):541–553.